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bleaching solution which contains a peracid is used, the improvement in which the peracid is used in an post-bleaching which is the last step of the bleaching process, the post-bleaching taking place in the presence of one or several earth-alkali metal compounds, wherein the pH of the post-bleaching solution is within the range of 3-8.

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13. (twice amended) A method according to claim 4, wherein the amount of the peracid used for the post-bleaching is 0.5-3 kg/tp.

REMARKS

Reconsideration of this application as amended is respectfully submitted.

Claim 1 has been amended to incorporate therein the subject matter of former Claim 8 which has been canceled by this Amendment. As amended, Claim 1 now recites that the pH of the post-bleaching solution is in the range of 3-8.

Moreover, Claim 13 has been amended to correct an obvious typographical error --- the units "kg/hp" have been amended to read -- kg/tp - representing the units kilograms per ton of pulp as also recited in Claim 4. As amended, Claim 13 is believed to have obviated the basis for the rejection applied to former Claim 13 under 35 U.S.C.§112, second paragraph, as being indefinite. Withdrawal of such rejection is respectfully requested.

A "marked up" copy of Claims 1 and 13 as amended is enclosed with additions being underlined and deletions contained within brackets.

As now claimed, applicants' invention is directed to an improvement in a method for the bleaching of chemical pulp, wherein the pulp is treated in a plurality of different steps and wherein at least in one step a bleaching solution which contains a peracid is used. The improvement claimed in the method is using the peracid in a post-bleaching which is the last step of the bleaching process, the post-bleaching taking place in the presence of one or several earth-alkali metal compounds, and the pH of the post-bleaching solution is in the range of 3-8.

Post-bleaching is applied to pulp for which the delignification process proper in a bleach-plant is already finished. A high degree of delignification, a high brightness and a low kappa number are attainted by applicants' claimed method. The purpose of post-bleaching is to compensate for the decrease of brightness and thereby avoid the need of overbleaching in the delignification process. Overbleaching is disadvantageous because it results in a high consumption of chemicals. Preferably, post-bleaching is carried out outside the bleach plant in a pulp flow piper or a storage tower or at a paper machine.

Applicants' claimed invention is directed a method for the bleaching of chemical pulp in which peracid is used in combination with at least one earth-alkali metal compound at the post-bleaching step. The claimed method brings about an increase of brightness while the use of the earth-alkali metal compound effectively counteracts the adverse effect peracid alone would have on the viscosity and strength of the pulp. This has been shown in the working examples.

A person skilled in the art would have understood the

term "post-bleaching" which constitutes the last step of, or rather an appendix to, a multi-stage method for the bleaching of chemical pulp.

Former Claims 1-16 have been rejected under 35 U.S.C.§103(a) as being obvious over U.S. Patent No. 3,865,685 to Hebbel, et al. Hebbel, et al. is clearly deficient. The Office Action argues, based on Example VIII of Hebbel, et al., that Hebbel, et al. describe a bleaching sequence starting with, e.g., peracetic acid and ending with a final post-bleaching stage with use of a per compound. However, the first stage described by Hebbel, et al. explicitly uses hydrogen peroxide, not peractic acid. Moreover, the per compound used for the final step is specified as hydrogen peroxide.

Further, Hebbel, et al. do not teach or suggest applicants' claimed post-bleaching step. As pointed out above, to a person skilled in the art, post-bleaching is a complementary step after the bleaching process proper and as much the very last bleaching step before feeding the pulp to a paper machine. Such post-bleaching can advantageously be carried out after the pulp has left the bleaching plant, in a storage tower or at a paper machine. According to Example VIII of Hebbel, et al. the pulp was diluted after each bleaching step and then partially dewatered to produce a filtrate, these measures applying also to the fifth and last bleaching step. A person skilled in the art would not regard the last step of the process described by Hebbel, et al. as a "post-bleaching" step.

Lastly, as now amended, applicants' claimed method further distinguishes over Hebbel, et al., including Example VII thereof, in that the post-bleaching solution is now

required to have a pH of 3-8. Hebbel, et al. teach a bleaching solution containing besides hydrogen peroxide also 1.0% of NaOH. Such a solution is strongly alkaline, having a pH well above 8. Hebbel, et al., therefore, do not teach or suggest post-bleaching with peracid in acidic or neutral conditions as specified by the claimed pH range of 3 to 8.

Regarding the presence of an earth alkali method compound at the post-bleaching stage, Hebbel, et al. only make a general mention of addition of magnesium sulfate or other stabilizer to the process described. There is no specific disclosure of post bleaching with an acidic or neutral bleaching solution in the presence of an earth alkali metal compound to be found in Hebbel, et al.

For these reasons, applicants respectfully submit that Claims 1-7 and 9-16 as amended are not taught or suggested by Hebbel, et al. Withdrawal of the rejection applied to former Claims 1-16 under 35 U.S.C.§103(a) as being obvious over Hebbel, et al. is respectfully requested.

Former Claim 14 has been rejected under 35 U.S.C.§103(a) as being unpatentable over Hebbel, et al. in view of U.S. Patent No. 4,222,819 to Fossum, et al. The deficiencies of the primary reference, Hebbel, et al. are set forth above. Fossum, et al. do not cure these deficiencies. Fossum, et al. has been cited as describing the use of certain calcium salts instead of magnesium salt. For the reasons set forth above with respect to Claim 1 (upon which claim 14 through Claim 6 depends), Claim 14 is believed to define patentable subject matter. Withdrawal of the rejection applied to former Claim 14 under 35 U.S.C.§103(a) as being unpatentable over Hebbel, et al. in view of Fossum, et al. is respectfully requested.

In light of the foregoing, applicants respectfully submit that Claims 1-7 and 9-16 as amended define patentable subject matter over the prior art, alone or in combination. An early allowance of all Claims is earnestly solicited.

Respectfully submitted,

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PATENT
Docket No. **3229-4003**

MARKED UP COPY OF AMENDED CLAIMS

1. (twice amended) [a] In a method for the bleaching of chemical pulp, wherein the pulp is treated in a plurality of different steps and wherein at least in one step a bleaching solution which contains a peracid is used, the improvement in which the peracid is used in an post-bleaching which is the last step of the bleaching process, the post-bleaching taking place in the presence of one or several earth-alkali metal compounds , wherein the pH of the post-bleaching solution is within the range of 3-8.

13. (twice amended) A method according to claim 4, wherein the amount of the peracid used for the post-bleaching is 0.5-3 [kg/hp] kg/tp.